



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,000	01/17/2007	Hiroyuki Kanbara	36856.1455	1561
54066 7590 10/10/2007 MURATA MANUFACTURING COMPANY, LTD. C/O KEATING & BENNETT, LLP 8180 GREENSBORO DRIVE SUITE 850 MCLEAN, VA 22102			EXAMINER EOFF, ANCA	
			ART UNIT 1795	PAPER NUMBER
			NOTIFICATION DATE 10/10/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JKEATING@KBIPLAW.COM
uspto@kbiplaw.com

Art Unit: 1753

DETAILED ACTION

1. The foreign priority document JP 2003-393551 filed on November 25, 2003 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.
2. Claims 19-36 are pending in the application. Claims 1-18 are canceled.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 30 and 33-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugimoto et al. (WO 01/95361)

With regard to claim 30, Sugimoto et al. disclose a photosensitive black ceramic paste and a photosensitive white ceramic paste (abstract). The paste basically contains a ceramic component, a glass component and a curable binder component (page 4, lines 18-19).

The ceramic component is a powdered or granular inorganic oxide or mixture thereof and could be alumina, titania, oxides of metals such as ruthenium (Ru), manganese (Mn), nickel (Ni), chromium (Cr), iron (Fe), cobalt (Co) and copper (Cu) (page 4, lines 26-30).

Art Unit: 1753

The curable binder components are compound cured by irradiation with radiations such as UV, electron beam and visible light, thereby making it possible to form a polymer compound. Specific examples of curable binder components are bisphenol A diglycidyl ether (meth)acrylic acid adduct, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate or triethylene glycol dimethacrylate (page 6, lines 3-9).

Sugimoto et al. further disclose that a curing initiator is usually used to cure the binder component (page 6, lines 10-11)

The curable binder component of the Sugimoto et al. is equivalent to the photosensitive monomer and the curing initiator is equivalent to the photopolymerization initiator of the instant application.

Sugimoto et al. disclose a black photosensitive ceramic paste composition and a white photosensitive white ceramic paste composition, both comprising curable binder components, curing initiators, a mixed powder of lead glass and ceramic and no polymeric compounds (Example on pages 12-13).

With regard to claim 33, Sugimoto et al. disclose that curable binder components that can be used for the photosensitive paste composition are compounds with double bond concentration within the range of about 8 mmol/g to about 11 mmol/g, such as ethylene glycol dimethacrylate, diethylene glycol dimethacrylate (page 6, lines 3-9).

With regard to claim 34, Sugimoto et al. disclose that curable binder components that can be used for the photosensitive paste composition are compounds with an ethylene oxide structure with a degree of polymerization of 3 or less, such as ethylene

Art Unit: 1753

glycol dimethacrylate, diethylene glycol dimethacrylate or triethylene glycol dimethacrylate (page 6, lines 3-9).

5. Claims 19, 25-27, 30 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi et al. (JP 07-152153).

With regard to claims 19 and 30, Takahashi et al. disclose a photosensitive paste comprising a hardening agent, polymerization initiator and a yellow fluorescent substance as a fine-particle ingredient (abstract, claims 1-2). The yellow fluorescence substance is an inorganic substance (par.0004, par.0013).

The hardening agent is a DPCA -60 (caprolactame-modified dipentaerythritol hexaacrylate), which is a multifunctional monomer (par.0011 and table 1 in par.0015), equivalent to the photosensitive monomer of the instant application.

The photopolymerization initiator consists of 2,4-diethylthioxanthone (DTEX) and 3,3,4,4-tetra-(tert-butoxycarbonyl) benzophenone (BTTB) (abstract and table 1 in par.0015).

Takahashi et al. further disclose a method of patterning the photosensitive paste, comprising the following steps:

- uniformly coating the photosensitive paste on a substrate by screen printing (par.0017 and fig.4a);
- exposing to UV rays through a mask (par.0018 and fig. 4b)
- applying the developer to remove the non-exposed parts of the coating (par.0020)

Art Unit: 1753

With regard to claims 25 and 36, Takahashi et al. disclose the composition of a photosensitive paste that does not contain any solvent. This composition meets the limitations for a composition with a content of solvent of 5% or less.

With regard to claim 26, Takahashi et al. disclose that the development is performed using 1,1,1-trichloroethane as solvent (par.0020).

With regard to claim 27, Takahashi et al. disclose that in the exposure step the photomask and the substrate are not contacting each other (see fig. 4b).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 20 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US Pg-Pub 2002/0160313).

With regard to claims 20 and 31, Park et al. disclose a photopolymerization type photosensitive paste comprising:

- a water-soluble polymer, such as cellulose derivatives or copolymers containing water-soluble monomers (par.0022);
- monomers or oligomers (par.0023);
- a photoinitiator (par.0024), and
- an inorganic fluorescent material (par.0025), in form of powder (par. 0007).

Art Unit: 1753

In Examples 1 and 2 (table 2, par.0036), Park et al. show photosensitive paste compositions comprising:

- HEC (hydroxyethyl cellulose) or HPC (hydroxypropyl cellulose) as binders;
- pentaerythritol triacrylate (PETA) as multifunctional monomer and 2-hydroxyethyl acrylate (HEA) as single functional monomer;
- HSP-188 as UV ray photoinitiator and
- fluorescent material.

In Examples 1 and 2, the ratio (photosensitive monomers) /(photosensitive monomers+polymeric binder) is about 0.833.

The polymeric binder could be comprised in the photosensitive paste composition in an amount 1-15% (par.0032) and the Examples 1, 2 show an amount of polymeric binder of 3%. By further reducing the amount of polymeric binder within the limits indicated by Park et al., the limitation regarding the ratio required by the instant application is met.

"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (MPEP 2144. 05 –II.

Optimization of Ranges)

Park et al. further disclose a method of forming a fluorescent film using the photopolymerization type photosensitive paste, said method comprising the following steps:

- preparing the photosensitive paste composition;

Art Unit: 1753

- coating the composition in a glass substrate;
- exposing the dried composition, and
- developing with pure water to form a fluorescent film (par.0013).

8. Claims 24 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (JP 07-152153) in view of Iguchi et al. (US Patent 6,197,480).

With regard to claims 19 and 24, 30 and 35, Takahashi et al. disclose a photosensitive paste comprising a hardening agent, polymerization initiator and a yellow fluorescent substance as a fine-particle ingredient (see paragraph 5 of the Office Action) and disclose that the composition is exposed with UV light (par.0018) but fail to disclose that the composition comprises UV absorbers.

Iguchi et al. disclose photosensitive paste comprising inorganic particles and an organic component containing a photosensitive compound (column 2, lines 42-44). The preferred type of photosensitive compounds are functional monomers, oligomers or polymers with one or more unsaturated groups in each molecule (column 6, lines 27-28 and 42-45). The photosensitive paste of Iguchi et al. can be exposed with visible light, near-UV light, UV light, electron beam, X-ray and laser beam (column 12, lines 60-62).

The addition of an UV absorber can be effective and a high aspect ratio, high definition and high resolution may be achieved by adding a compound with high UV absorbing performance (column 8, lines 52-55).

Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to include an UV absorber as disclosed by Iguchi et al. in the

Art Unit: 1753

composition of Takahashi et al., in order to improve the qualities of the pattern formed by the composition.

9. Claims 21 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (JP 07-152153) in view of Roach (US Pg-Pub 2004/0170925).

With regard to claims 19 and 21, 30 and 32, Takahashi et al. disclose a photosensitive paste comprising a hardening agent, polymerization initiator and a yellow fluorescent substance as a fine-particle ingredient (see paragraph 5 of the Office Action). The photosensitive paste of Takahashi et al. comprises 53% by weight of yellow fluorescent powder, 13% by weight of monomer DPCA-60 and 4.5% by weight of initiator DETX.

However, Takahashi et al. fails to disclose that the yellow fluorescent powder can be comprised in the composition of the photosensitive paste in an amount between 60% and 90% by weight.

Roach et al. disclose a positive imageable thick film composition comprising photopolymer systems and particulate materials (abstract), such as particles, powders and nanostructures materials (par.0059). The pastes are applied by screen-printing and further patterned by UV imaging and development with a base (par.0071). In Examples 2 and 3, Roach et al. disclose that a particulate material, such as a silver powder is comprised in the paste in an amount between 69.9% by weight and 72% by weight (par.0090, par.0093). The composition has the advantage that a uniform layer of the compositions is screen-printed on a substrate with controlled thickness (par.0074).

Art Unit: 1753

Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to apply the teaching of Roach et al. and use the inorganic fluorescent substance in an amount around 70% by weight in the composition of Takahashi et al., in order to obtain a layer that can be screen-printed on a substrate with controlled thickness (Roach et al., par.0074).

10. Claims 19, 22- 23 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iguchi et al. (US Patent 6,197,480) in view of Sugimoto et al. (WO 01/95361).

With regard to claims 19 and 28-29, Iguchi et al. disclose a photosensitive paste including inorganic particles and an organic component and a method of producing a plasma display including said photosensitive paste (abstract). The paste comprises glass particles with diameter up to 10 um (column 3, lines 37-42), various metal oxides (column 5, lines 36-44) and an organic component, comprising at least one of the following photosensitive materials: photosensitive monomers, photosensitive oligomers and photosensitive polymers (column 6, lines 14-17) and additives such as photoinitiators (column 6, line 19). Functional monomers, oligomers or polymers with one or more unsaturated groups in the molecule are preferred because they can be used conveniently in combination with inorganic particles (column 6, lines 27-28 and 42-45).

The process of Iguchi et al. comprises the following steps:

- applying the paste to a film (column 12, line 37);

Art Unit: 1753

- exposing the paste, preferably with UV light (column 12, lines 45-62)

The exposure can be done with a mask of negative or positive type (column 12, lines 48-49), or direct pattern formation by means of a red or blue visible laser beam or Ar ion laser beam may be performed instead of using the mask, therefore the process of Iguchi et al. meeting the limitation of claim 28.

- developing the making use of the difference in solubility to developing solution between the exposed and the unexposed portions (column 13, lines 25-27);

- firing the pattern (column 13, line 55). The process of forming a pattern including a firing step meets the limitation of claim 29.

However, Iguchi et al. fail to disclose that a photosensitive paste comprising substantially no polymer can be used in the method of producing a plasma display described above.

Sugimoto et al. disclose a photosensitive black glass ceramic paste and a photosensitive white ceramic paste (abstract). The paste basically contains a ceramic component, a glass component and a curable binder component (page 4, lines 18-19). The photosensitive paste is used for producing ribs for plasma display panels (abstract).

The ceramic component is a powdered or granular inorganic oxide or mixture thereof and could be alumina, titania, oxides of metals such as ruthenium (Ru), manganese (Mn), nickel (Ni), chromium (Cr), iron (Fe), cobalt (Co) and copper (Cu) (page 4, lines 26-30).

The curable binder components are compound cured by irradiation with radiations such as UV, electron beam and visible light, thereby making it possible to

Art Unit: 1753

form a polymer compound. Specific examples of curable binder components are bisphenol A diglycidyl ether (meth)acrylic acid adduct, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate or triethylene glycol dimethacrylate (page 6, lines 3-9).

Sugimoto et al. further disclose that a curing initiator is usually used to cure the binder component (page 6, lines 10-11)

The curable binder component of the Sugimoto et al. is equivalent to the photosensitive monomer and the curing initiator is equivalent to the photopolymerization initiator of the instant application.

Sugimoto et al. disclose a black photosensitive glass-ceramic paste composition and a white photosensitive white ceramic paste composition, both comprising curable binder components, curing initiators, a mixed powder of lead glass and ceramic and no polymeric compounds (Example on pages 12-13).

Since the photosensitive paste composition of Sugimoto et al. is used in the production of display panels and the paste comprises components required by the paste of Iguchi et al. (multifunctional monomers as organic component and glass particles), it would have been obvious for one of ordinary skill in the art to use the composition of Sugimoto et al. in the process of producing a plasma display of Iguchi et al., with a reasonable expectation of success.

With regard to claim 22, Sugimoto et al. disclose that curable binder components that can be used for the photosensitive paste composition are compounds with double bond concentration within the range of about 8 mmol/g to about 11 mmol/g, such as ethylene glycol dimethacrylate, diethylene glycol dimethacrylate (page 6, lines 3-9).

Art Unit: 1753

With regard to claim 23, Sugimoto et al. disclose that curable binder components that can be used for the photosensitive paste composition are compounds with an ethylene oxide structure with a degree of polymerization of 3 or less, such as ethylene glycol dimethacrylate, diethylene glycol dimethacrylate or triethylene glycol dimethacrylate (page 6, lines 3-9).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anca Eoff whose telephone number is 571-272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AE

ANCA EOFF
Cynthia Kell